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are leading to an impending shortage of those research workers, without whom no science can advance. On the other hand, the revival of industry is tempting men away from "the corps of research workers" into the service of the great manufacturing corporations. During the past four academical years the Advisory Council has spent about £50,000 in maintenance grants to research workers, and it expects to spend nearly as much in the forthcoming year. "No conditions are attached to the grants made to workers whose sole aim is the extension of knowledge, either as to the line of their work or as to the use to be made of the results," though, of course, great care is taken that the recipients of state aid should be genuine workers at the solution of a knotty problem.

The second part of the program includes the organization of research associations for special industries. A large and wealthy firm has its own laboratories and its own staff of chemists or physicists. But in many industries the firms are too small to do this work for themselves, and in all industries cooperation saves waste and duplication of effort. A fund of a million sterling was authorized by Parliament to assist in the establishment of research associations, of which eighteen are already at work and five others have been approved. The firms connected with the existing associations have undertaken to raise an annual sum of nearly £40,000 for their purposes, and it is probable that this income will be largely exceeded as the benefits derived from research become practically apparent. The industries which already have research associations in existence are those of cotton, linen, wool, leather, bootmaking, laundering, sugar, cocoa and jam, motoring, glass, iron, nonferrous metals, rubber, photography, scientific instruments, Portland cement, refractory materials, and shale oil. It is much to be hoped that the rapid growth of these promising infants will soon convince industry as a whole of the necessity for scientific research as a basis for the profitable union of Capital and Labor.

The third item in the program of the Advisory Council is the conduct and co-ordination of national research; in other words, provision for dealing at the national expense "with certain fundamental problems which were of such wide application that no single industry, however intelligent or highly organized, could hope to grapple with them effectively." The first of these basic problems is that of fuel, to study which the Fuel Research Board was established in 1917. Closely allied is the conservation of coal and mineral resources. The problem of the preservation of food and that of building materials and construction are also being handled by special Boards. The Geological Survey and the National Physical Laboratory have been handed over to the Research Department. The Radio Research Board takes its place beside three new boards, dealing respectively with chemistry, physics and engineering, to coordinate the scientific work still required for the fighting services. The fourth item of the program is the granting of aid to scientific and professional societies for purposes of research.

ENGLISH MEDICAL LABORATORIES

Medical service in England is more elaborately organized under the control of the state than in the United States. There is a Ministry of Health which has appointed a medical consultive council and this council has presented a report which is now under consideration. The *British Medical Journal* prints an abstract according to which it is pointed out that medical treatment must be both individual and communal, and that individual treatment may be either domiciliary or institutional. By communal treatment is to be understood pre-natal and maternity care, child welfare, the inspection and treatment of school children, dental treatment, clinics for early tuberculosis, and facilities for physical culture. The general conception is that domiciliary treatment in each district should be based on a "Primary Health Center." This institution would be conducted by the general practitioners of the district, and would be provided with an efficient nursing service. It would be linked with a "Secondary Health Center" in some town conveniently placed in relation to the means of communication. Opportunities would be provided for consultation, either at the primary center or at the homes of the patients, with physicians, surgeons, and specialists of the secondary center, which would itself be brought into corresponding relation with a medical school hospital.

A sketch is given of a scheme for laboratory services. The first and essential function of the laboratory at a primary center would be to give facilities to the general practitioner; it would be so equipped as to enable him personally to make any examinations he desired to undertake. The equipment would be supplied from the secondary center and adapted to meet any increase in knowledge, skill and interest displayed by the practitioners concerned. Some person must be placed in charge of such a laboratory; it is thought that his qualifications might vary with the size, geographical situation, and special needs of the center.

The laboratory of a secondary center should provide ample accommodation and equipment, and its senior staff should be highly qualified to do clinical laboratory work, both for the primary center and for the hospital of the secondary center; it would also do postgraduate teaching. The head of the laboratory would be a well qualified pathologist, and the staff would comprise specialists in morbid anatomy, bacteriology, and pathological chemistry. Some of the assistants would be preparing for the higher posts in the service; others in an intermediate class, would furnish recruits for the staff of the primary center.

The laboratory of the secondary center would be linked with the chief or university center, which would have a special laboratory for health services distinct from a professorial department, though in close contact with it. A separate health services laboratory would protect the academic staff from routine, leaving it free for teaching and fundamental research work. The staff of the health services laboratory would be recruited from that service and be dependent upon meritorious performance within it. At the same time it is recognized that no rigid barrier should be erected between the academic pathologist and those engaged in the health services. Though there would be two distinct careers, circumstances would often cause individuals to pass from one to the other.

The health services laboratory of a university center in addition to the routine work, would carry out the more difficult investigations referred to it from the subsidiary centers, but it might also undertake much of the routine work for the university hospital. The director of such a laboratory would rank with a university professor, but would usually be a distinguished pathologist with tastes inclined to organization and administration rather than teaching.

With regard to research, it is suggested that the organization throughout the proposed health service would facilitate inquiry into the causes of disease. It is suggested that the facts showing the need for inquiry might often be brought together in the first place by the medical practitioners in a locality; the manner in which it should be further prosecuted would depend upon the subject, but research into fundamental problems would still continue to be conducted through the university and the Medical Research Council. A national organization of laboratories in touch with every branch of the health services would, it is believed, provide opportunity for systematic investigation and team work. The director of the health services laboratory at the university center would be in a position to start machinery for the intensve investigation of any urgent problem, and with the goodwill of the general practitioners the investigation would include cases never available in the wards of a hospital. In particular, the earliest stages of disease might be made the subject of organized research, which, it is hoped, might be subsidized and perhaps supervised by the Medical Research Council.

SCIENTIFIC ITEMS

WE record with regret the death of Harmon Northrop Morse, for forty-four years associate and professor of chemistry at the Johns Hopkins University; of Samuel James Meltzer, head of the department of physiology and pharmacology of the Rockefeller Institute for Medical Research; of Arthur Searle, professor emeritus of astronomy at Harvard University; of Isadore Dyer, dean of the medical school of Tulane University; of Yves Delage, professor of zoology at the Sorbonne, Paris, and of Sven Leonhard Törnquist, professor of geology at Lund.

NOBEL prizes have been awarded to Dr. Jules Bordet, professor of bacteriology at Brussels, and Dr. August Krogh, professor of physiology at Copenhagen.—Professor Stephen Moulton Babcock, of the University of Wisconsin, inventor of the Babcock test for determining the amount of butter fat in milk, reached his seventy-seventh birthday on October 22, and in honor of the event and of his work a university convocation was held. Professor Babcock is engaged in active work in his laboratory.

THE International Congress of Mathematicians at the Strasbourg meeting accepted the invitation presented by Professor Leonard E. Dickson to hold the next congress in New York in 1924.—At the International Congress of Physiologists, held in Paris, it was resolved, on the invitation of Sir E. Sharpey Schafer, to hold the next meeting in Edinburgh in 1923.